C10.2 Sign Supports

See the Office of Bridges and Structures web site for archived Methods Memos listed under articles in this section.

The Methods Memos for which policies have been partially revised and/or for which document references have been updated are noted as partially revised. Any obsolete Methods Memos that apply to this section are listed at the end.

C10.2.1 General

C10.2.1.1 Policy overview

Methods Memo No. 119: Access for Dynamic Message Signs
3 March 2006

C10.2.1.2 Design information

C10.2.1.3 Definitions

C10.2.1.4 Abbreviations and notation

C10.2.1.5 References

C10.2.2 Loads

C10.2.2.1 Dead

C10.2.2.2 Live

C10.2.2.3 Ice

C10.2.2.4 Wind

C10.2.2.5 Fatigue

C10.2.3 Group loads and application to signs and supports

C10.2.4 Analysis and design

C10.2.4.1 New structures

C10.2.4.1.1 Steel

C10.2.4.1.2 Aluminum

C10.2.4.2 Existing structures

Method's Memo No. 148: Review of Existing Sign Truss for Larger Sign Areas
17 August 2006

C10.2.4.3 Overhead bridge sign truss review

Method's Memo No. 148: Review of Existing Sign Truss for Larger Sign Areas
17 August 2006

C10.2.4.4 Overhead cantilever sign truss review

Method's Memo No. 148: Review of Existing Sign Truss for Larger Sign Areas
17 August 2006

C10.2.4.5 Bridge-mounted sign support review

Method's Memo No. 148: Review of Existing Sign Truss for Larger Sign Areas
17 August 2006

C10.2.5 Detailing

Procedure for tightening anchor rod (bolt) nuts for overhead bridge truss

1) This work shall be performed only on days with winds less than 15 mph. All tightening of the nuts is to be done in the presence of the inspector. Once the tightening procedure is started it must be completed on all of the base plate nuts without pause or delay.
2) Properly sized wrenches designed for tightening nuts and/or bolts shall be used to avoid rounding or other damage to the nuts. Adjustable end or pipe wrenches may not be used.
3) Base plate, anchor rods, and nuts are to be free of any dirt or debris.
4) Apply stick wax or bees wax to the threads and bearing surfaces of the anchor rod, nuts, and washers.
5) Tighten top nuts so they fully contact the base plate. Tighten leveling nuts to snug tight condition. Snug tight is defined as the full effort of one person on a wrench with a length equal to 14 times the bolt diameter but not less than 18 inches. Apply the full effort as close to the end of the wrench as possible. Pull firmly by leaning back and using the entire body weight on the end of the wrench until the nut stops rotating. Use a minimum of two separate passes of tightening. Sequence the tightening in each pass so that the nut on the opposite side, to the extent possible, will be subsequently tightened until all of the nuts in that pass have been tightened.
6) Tighten top nuts to snug tight as described for the leveling nuts.
7) Match-mark the top nuts and base plate using paint, crayon, or other approved means to provide a reference for determining the relative rotation of the nut and base plate during tightening. Using a striking or hydraulic wrench, further tighten the top nuts in two passes as listed in the following table. Use a sequence of tightening in each pass so that the nut on the opposite side, to the extent possible, will be subsequently tightened until all nuts in that pass have been turned. Do not rotate the leveling nut during the top nut tightening.

Anchor bolt size	First pass	Second pass	Total rotation
Less than or equal to 1½ inch diameter	1/6 turn	1/6 turn	1/3 turn
Greater than 1½ inch diameter	1/12 turn	1/12 turn	1/6 turn

8) Lubricate, place, and tighten the jam nuts to snug tight.

Procedure for tightening anchor rod (bolt) nuts for overhead cantilever truss

Use the same notes as above, but delete the second line in the table because the typical cantilever truss has 2¼-inch diameter anchor rods.

Erection tolerances for aluminum/steel overhead bridge truss

Foundations and anchor bolts

1) Each foundation shall be accurately located, with the center of the two anchor bolt groups not more than 1 inch from the plan location in the direction parallel with and perpendicular to the overhead truss.

2) The two foundations shall be parallel, with the distances along the overhead truss between centers of front and rear anchor bolt groups differing by not more than 1 inch.
3) Elevations of the top of each foundation shall be within 1 inch of plan elevation.
4) Anchor bolt groups shall be located accurately by template or other positive means, with centers of adjacent anchor bolt groups within 3/16 inch of the correct distance apart.
5) Anchor bolts shall be plumb within ¼ inch per foot from vertical.
6) Anchor bolts shall project above top of foundation within ¼ inch of the plan dimension.
7) Welding of anchor bolts shall not be allowed. The contractor shall obtain a template from the manufacturer/fabricator for proper placement of the anchor bolts.

Completed aluminum and steel structure

1) Each truss support column shall be plumb within 1/16 inch per foot of vertical in two perpendicular directions.
2) Stick-out of each truss lower chord shall be within 2¾ and 5½ inches measured from outer U-bolt to inside of chord end plate.
3) The truss shall be square within supports. Horizontal line between chords shall be level within 1/16 inch per foot of horizontal, and vertical line between chords shall be plumb within 1/16 inch per foot of vertical.

Erection tolerances for aluminum/steel overhead cantilever truss

Foundations and anchor bolts

1) The foundation shall be accurately located, with the center of the anchor bolt group not more than 1 inch from the plan location.
2) The elevation of the top of the foundation shall be within 1 inch of plan elevation.
3) Anchor bolts shall be plumb within ¼ inch per foot from vertical.
4) Anchor bolts shall project above top of foundation within ¼ inch of the plan dimension.
5) Welding of anchor bolts shall not be allowed. The contractor shall obtain a template from the manufacturer/fabricator for proper placement of the anchor bolts.

Completed aluminum and steel structure

1) The steel end post shall be plumb within 1/16 inch per foot of vertical in two perpendicular directions.
2) The truss shall be square within its supports. Horizontal line between chords shall be level within 1/16 inch per foot of horizontal, and vertical line between chords shall be plumb within 1/16 inch per foot of vertical.

Methods Memo No. 88: Rodent Guards on Cantilever Sign Supports and I-235 Overhead Trusses 26 January 2004

Methods Memo No. 119: Access for Dynamic Message Signs 3 March 2006

C10.2.6 Shop drawings

C10.2.7 Structures and components

C10.2.7.1 Overhead bridge sign trusses

C10.2.7.2 Overhead cantilever sign trusses

C10.2.7.3 Roadside sign structures

C10.2.7.4 Runways and ladders

C10.2.7.5 Bridge-mounted sign supports

C10.2.7.6 Foundations